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A REVIEW OF THE SOUTHERN SOUTH AMERICAN GENUS *GYRETRIA* ENDERLEIN (DIPTERA: SPHAEROCERIDAE: LIMOSININAE)

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Abstract.—*Gyretria melanogaster* (Thomson) and *Gyretria biseta* (Duda), **new combinations**, are redescribed. The genus *Gyretria* Enderlein, previously treated as a synonym of *Chaetopodella,* is resurrected for these two species. *Gyretria* is redescribed and its relationships to other Limosininae discussed. The presence of eversible abdominal sacs, found in males of both *Gyretria* species, is noted for the first time in the Sphaeroceridae. A **lectotype** is designated for *Leptocera* (*Chaetopodella) biseta* Duda, and *Sclerocoelus rectangularis* (Malloch*)* is given as a **new combination**.

Key Words: Diptera, Sphaeroceridae, *Gyretria* restituted, new combinations, lectotype designation, distribution

Several species of New World *Limosininae* are characterized by velvety black pruinosity, usually with patterns of stripes and silver spots at least around some bristle bases. Some of these species are in well-defined genera such as *Poecilosomella* Duda, *Pterogramma* Spuler, *Opacifrons* Duda, and *Leptocera* Olivier, but others have been artificially grouped within the similarly patterned Old World genus *Chaetopodella* Duda. Of the four New World species previously placed in *Chaetopodella,* one (*rectangularis* Malloch) belongs in *Sclerocoelus* Marshall (**n. comb.**), and one (*tonsa* Duda) has little in common with *Chaetopodella* except color. *Chaetopodella tonsa* (Duda) is one of two velvety black species in an undescribed genus of mostly brown species. The two remaining New World species usually placed in *Chaetopodella* (*melanogaster* Thomson and *biseta* Duda) are similar to Old World *Chaetopodella* in most non-abdominal characters including pigmentation and chaetotaxy of the female legs and thorax. Despite these similarities, the two New World species differ widely from Old World *Chaetopodella* in abdominal characters and in several unique sexually dimorphic characters of the head and legs, and warrant treatment as a separate genus. Previous authors have recognized the distinctness of *melanogaster* and *biseta,* and genera have been proposed with each of these species as type. Since one of the generic names available for this group is preoccupied, the remaining generic name, *Gyretria* Enderlein, originally coined for the single species *binodatipes* Enderlein (= *melanogaster* Thomson), is resurrected and redefined to include *Gyretria melanogaster* and *Gyretria biseta.*

Gyretria Enderlein

Gyretria Enderlein 1938: 652. Type species *Gyretria binodatipes* Enderlein 1938 (original designation) = *Limosina melanogaster* Thomson 1869.

Alima Duda 1938: 5, 95 (preoccupied by *Alima* Leach 1818 [Crustacea]). Type species, *Leptocera (Chaetopodella) biseta* Duda 1925 (monotypy).

Alma Duda; Richards 1967: 11 (misspelling; also preoccupied by *Alma* Grube 1855 [Oligochaeta]).

Diagnosis.—Members of the genus *Gyretria* are among the easiest sphaerocerids to recognise to the generic level. Their velvety black integument combined with milky or opaque-brownish wing membranes gives them a distinctive habitus, and the presence of ventral bristles on both the mid tibia and tarsomere one of the mid leg distinguish *Gyretria* from the few other South American species with similar colors. Unlike Old World *Chaetopodella, Gyretria* have legs that are sexually dimorphic in both species, the fore and mid femora bearing stout ventral bristles in the male and tarsomeres 1 and 2 of the hind leg flattened and greatly enlarged in the male. The most unusual character shared by both *Gyretria* species is a pair of eversible sacs that extend anteriorly into the male abdomen from openings behind the fourth sternite.

Generic description.—Body length 2–3 mm, body dark brown to black with a heavy silvery pruinosity, pruinosity of scutum broken by three relatively bare longitudinal strips. Frons longitudinally ridged, orbits and interfrontal strips raised. Frons with silvery pollinose interfrontal strips, back of head with 2 bright silvery spots. Postocellar and postvertical bristles small, inner and outer occipital bristles large, subequal to upper orbital bristle; inner and outer vertical bristles very large. Prosternum linear, bare. Mid coxa and trochanter each with a very long anterior preapical bristle. Mid tibia of female with a large mid ventral and apical ventral bristle; mid tibia of male without a mid ventral bristle but with a dense row of about 20 long, fine ventral bristles on distal half. Dorsal surface of mid tibia in both sexes with preapical dorsal bristles and 4–5 anterodorsal and 4–6 posterodorsal bristles. Tarsomere one of mid leg with a mid ventral bristle. Hind leg of male with first two tarsomeres greatly enlarged, tarsomeres 2–5 strongly flattened, hind leg of female with tarsomere 2 unmodified and tarsomere 1 short but not strongly flattened or enlarged. Scutum with 3 pairs of postsutural dorsocentral bristles (sometimes with a small presutural pair), three pairs of intra-alar bristles, 2 supra-alar bristles and a very long postalar bristle reaching beyond apex of scutellum. Scutellum with 4 long bristles, each basally surrounded by a small patch of silver pruinosity. Acrostichal setulae long, in 6–8 rows between anterior dorsocentral bristles. Wing long, at least slightly opaque, alula broad; halter white.

Male abdomen conspicuously constricted behind segment three, with narrower posterior part of abdomen usually deflexed; tergite 5 (normally telescoped under tergite 4) short, almost transverse dorsally. Membrane between sternite 4 and sternite 5 with two eversible sacs behind sternite 4, sacs often everted in critical-point dried specimens (Fig. 1). Sternite 5 small, divided into longidudinal anterior and transverse posterior parts. Synsternite 6+7 free from sternite 8, broad ventrally, closely associated with posterior part of sternite 5, expanded on right side and continuing across dorsum to form a complete loop; ring sclerite large. Epandrium with stout posterolateral bristles and a group of long ventral bristles; ventral angles of epandrium widely separated and extending ventral to cerci; cercus pale, flat; subepandrial sclerite with heavily sclerotised, dorsally projecting lateral processes. Surstylus broad, pale, setulose. Hypandrium heavily sclerotised, with a short, dark anterior apodeme; arms fused to anterolateral corners of epandrium. Distiphallus very broad. Female abdomen short, not telescoping; tergite 8 divided into two lateral sclerites, tergite 10 setulose, with 2–3 small dorsal bristles; cerci very short, setulose, with some longer distal bristles. Spermathecae spherical, single unpaired spermatheca larger than the 2 paired ones, sclerotised parts of ducts short.

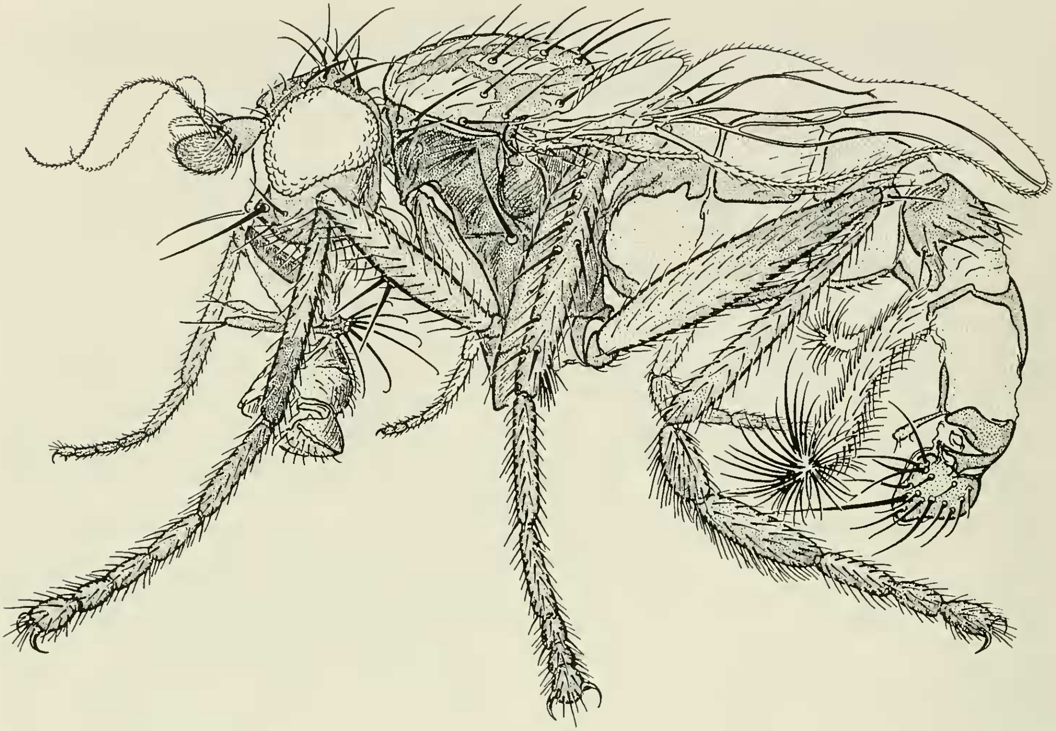


Fig. 1. *Gyretria biseta*, Male.

Relationships and similar genera.—*Gyretria* species have a number of superficial similarities to *Chaetopodella*, including the ventral bristle on tarsomere one of the mid leg, three dorsocentral bristles, opaque wing membrane, non-telescoping female terminalia, and similar chaetotaxy on the female mid tibia. None of the many unusual male genital characters and sexually dimorphic leg characters are shared between *Gyretria* and *Chaetopodella*. Similar color characters are seen in two species of the northern Neotropical *tonsa* group, but these species lack a ventral bristle on tarsomere one, lack a mid ventral mid tibial bristle in both sexes, and appear to belong to a larger clade within which the color characters are derived independently of either *Gyretria* or the Old World *Chaetopodella*. Most of the abdominal characters of *Gyretria* are so derived they are difficult to compare with homologous characters in other clades. On the basis of non-abdominal characters *Gyretria* is most similar to the Old World genus *Chaetopodella*, and it is possible that some of the shared color and chaetotaxy characters do reflect close relationships between Old World *Chaetopodella* and the southern South American clade discussed here. Nonetheless, the southern South American clade is geographically isolated, there are no abdominal synapomorphies linking the New World and Old World species, and there are many distinct defining characters for the southern South American clade. These facts argue strongly for the treatment of the southern South American clade as a separate genus *Gyretria* rather than treating it as part of the Old World genus *Chaetopodella*.

KEY TO SPECIES OF *GYRETRIA*

– Head with a single orbital bristle. Wing membrane brownish. Hind tarsomeres brown . . . . *G. biseta* (Duda)
– Head with two orbital bristles. Wing membrane white. Tarsomeres 3–5 of hind leg white, con-

trasting with brown tarsomere 1. . . . .
. . . . *G. melanogaster* (Thomson)

Gyretria biseta **(Duda 1925), new combination**

(Figs. 1–11)

Leptocera (Chaetopodella) biseta Duda 1925: 149. Type locality: Bolivia, Mapiri, Lorenzopata.

Chaetopodella biseta: Duda 1929: 34 [generic combination].

Alima biseta: Duda 1938: 95 [generic combination].

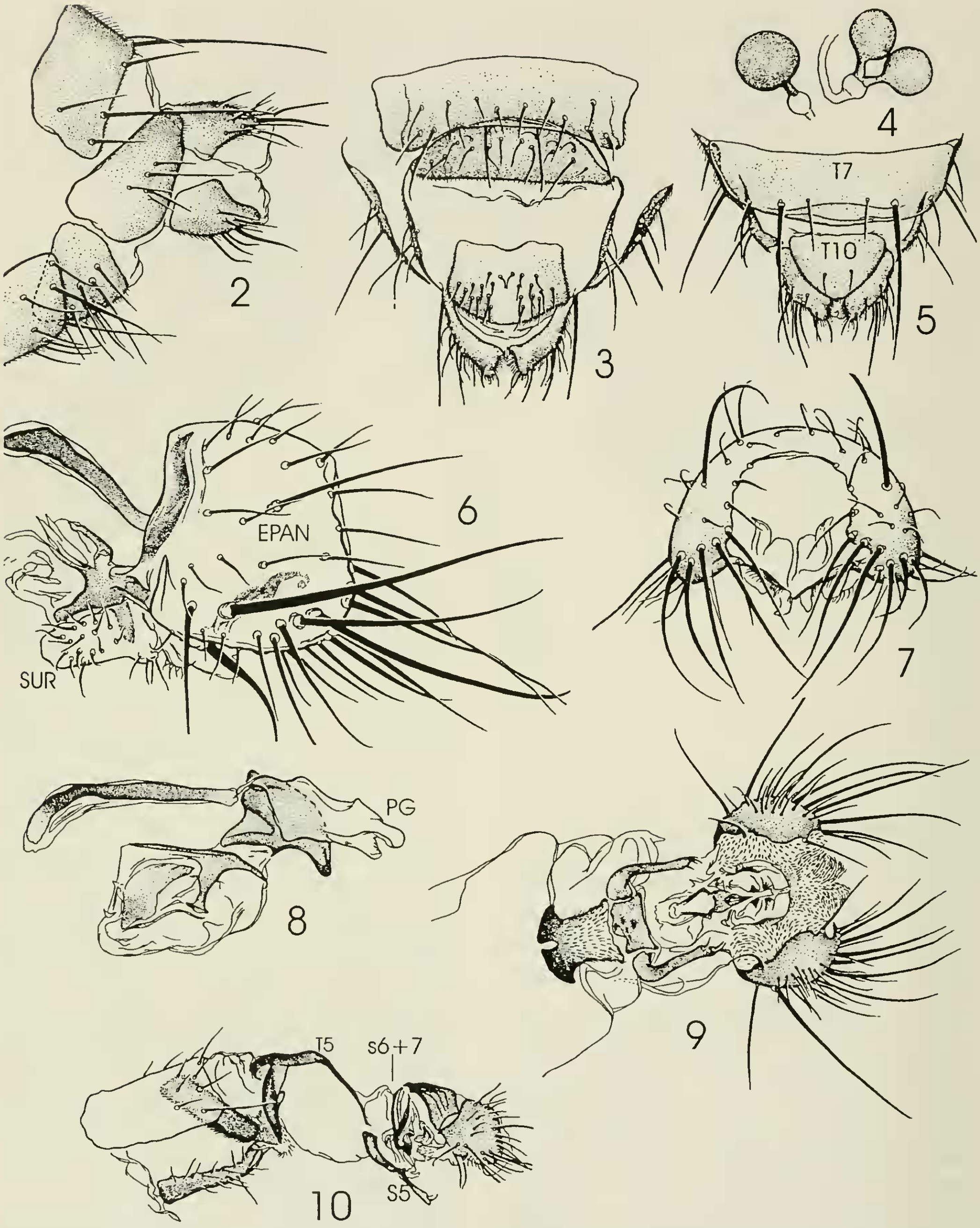
Description.—Body length ca. 2.5 mm. Pruinosity of scutum broken by three relatively bare longitudinal strips, middle strip wider than lateral ones, scutum bare between posterior two pairs of dorsocentral bristles. Interfrontal area 1.5× as broad as high, flanked by three equal interfrontal bristles. Orbital bristles stout, in a single long pair. Male face silvery yellow, almost white; female face light brown; antenna and gena light brown, arista short-haired,as long as head width; eye bare, twice as high as genal height; gena with 3–4 rows of small bristles. Palp with two long preapical ventral bristles, stipes heavily sclerotized, with a conspicuous row of about 8 long, stout bristles in male (Fig. 1); stipes with shorter, thin bristles in female.

Fore leg brown in female; male tibia bicolored with basal half pale brown to yellow, distal half black. Fore femur of male with 2 long, stout ventral bristles; fore tibia of male swollen distally. Mid leg brown, femur paler than tibia. Mid femur of male with a short and a long ventral bristle in basal third; mid femur of female without ventral bristles. Dorsal surface of mid tibia in both sexes with preapical dorsal bristles and 5 anterodorsal and 4 posterodorsal bristles, distal posterior surface of male mid tibia with a dense patch of about 10 stout bristles (Fig.1); dorsal preapical bristle of male mid tibia stout and distictly bent at middle. Tarsomere one of male curved, expanded distally and with row of stout anterior bristles on distal two-thirds. Hind legs mostly pale brown, indistinct rings of darker brown present distally on femur and both proximally and distally on tibia; tarsomeres dark brown. Katepisternum with 2 long bristles, posterior dorsal bristle reaching wing base, anterodorsal bristle one third as long. Wing slightly opaque, brownish; viens pale brown; second costal sector 1.6× as long as third costal sector, costa extending slightly beyond end of R4+5; alula broad. Halter white.

Male abdomen with first two tergites (syntergite 1+2 and tergite 3) twice as long and almost twice as broad as tergite 4, syntergite 1+2 velvety black, tergites 3 and 4 velvety black except for large, quadrate, pale, posteromedial sections, tergite 5 (normally telescoped under tergite 4) reduced to a U-shaped anterior margin, narrow anterolateral lobes, and a long, narrow, posteromedial apodeme (Fig. 10). Sternite 4 narrow, subquadrate, not modified, membrane between sternite 4 and sternite 5 with two very large membranous everted lobes or invaginations covered with long, pale setae (everted lobes in critical-point dried specimens, invaginations in air-dried specimens) (Figs. 1, 10). Sternite 5 with a dark, subquadrate, anteriorly emarginate anterior piece and a transverse posterior piece with posterolateral corners extended into pale, multifurcate lobes (Fig. 9). Epandrium with conspicuously long ventral and posteroventral bristles, posterodorsal bristle shorter than largest ventral bristles (Figs. 6–7). Surstylus broad, pale, setulose, with a narrow, distally expanded lateral lobe near mid ventral margin (Fig. 6). Postgonite broad, distally bifurcate, basiphallus short, with a tapered epiphallus (Fig. 8).

Female abdomen (Figs. 2–3, 5) short, sternite 8 small, simple; no visible internal genital sclerotisation. Sternite 10 large, setulose, medially pale. Spermathecae spherical; surface smooth (Fig. 4)

Type material examined.—Lectotype (male, here designated to fix the current interpretation of this name and to ensure stability and uniformity in its future interpre-



Figs. 2–10. *Gyretria biseta.* 2–5, Female. 2, Terminalia, left lateral. 3, Terminalia, ventral. 4, Spermathecae. 5, Terminalia, dorsal. 6–11, Male. 6, Terminalia, left lateral. 7, Terminalia, posterior. 8, Aedeagus and associated structures. 9, Terminalia and sternite 5, ventral. 10, Posterior part of abdomen, left lateral. Abbreviations: T5, tergite 5; T7, tergite 7; T10, tergite 10; PG, postgonite; S6+7, synsternite 6+7; S5, sternite 5; SUR, surstylus; EPAN, epandrium.

tation). BOLIVIA. Mapiri, Lorenzopata "7.v.03" (SMTD). (Other specimens in type series in very bad condition).

Other material examined (approx. 250 specimens).—ARGENTINA. Jujuy, Calilegua National Park, 18–28.xii.1987, S. Peck. Salta, Campo Quijano, 30 km E Salta, 20.ii.1992, dung traps and swept over dung, S.A. Marshall; Rosario de Lerma, 29.ii.1992, swept from ditch, S.A. Marshall. Misiones, Iguazu, 4–10.ix.1927, RC & EM Shannon (USNM). Catamarca, El Pintado, S. La Viña, 650 m, 27–29.ix.1968, L. Peña (CNC). BOLIVIA. Santa Cruz, Potrerillo de Cruerda, 4–7.i.1998, H. Howden. BRAZIL. Rio de Janeiro, Nova Friburgo, sweep dirty area near water falls, 26.i.1990, S.A. Marshall; Minas Gerais, 1km E Lavras, dung traps in ditch, 18–20.ii.1990, S. A. Marshall; 20 km SW Barbacena, dung traps, 25.ii.1990, S.A. Marshall; Prado, sweep along river, 21.ii.1990, S.A. Marshall; Tiradentes, malaise trap, 15–17.ii.1990, S.A. Marshall. Paraná, Curitiba, University campus, sweep in forest, 10.ii.1990, S.A. Marshall; Morretes, 9.ii.1990, S.A. Marshall; Curitiba, dung traps 30 km S BR 277, 6–9.ii.1990, S.A. Marshall; Curitiba, intercept trap in woods behind Natural History Museum; Londrina, Parque Arthur Thomas, sweep, 1.ii.1990, S.A. Marshall. PARAGUAY. Paraná, SW Saltos del Guaira, xii.8.1971, L. Peña (AMNH).

Distribution.—Argentina, Bolivia, Brazil, Paraguay,

Comments.—This highly autapomorphic species is one of the most easily recognised species of Sphaeroceridae. The loss of one orbital bristle, reflected in the specific name, is unusual, as are the sexual dimorphisms of face color and leg chaetotaxy. The very large, apparently inflatable abdominal pouches opening behind sternite 4 are of special interest. Many Diptera (including some *Ramphomyia* females [Empidae] and many Tephritidae males) puff out their abdominal pleura to either increase their body profile or to expose pheromone glands. Eversible pouches are found in a few acalyptrates other than *Gyretria*, including the chloropid *Thaumatomyia notata* Meigen, some Otitidae (including *Xanthocrona* Wulp) and the tephritid *Anastrepha ludens* (Loew). The latter species is known to use the everted pouches to aid in dissemination of sexual attractant pheromones, and *Gyretria* species probably use their pouches in the same fashion.

Gyretria melanogaster (Thomson 1869), **new combination**
(Figs. 11–18)

Limosina melanogaster Thomson 1869: 603. Type locality: Argentina, Buenos Aires.

Leptocera (Chaetopodella) melanogaster: Richards 1963: 238 [generic combination].

Chaetopodella melanogaster: Roháček 1983: 114 [generic combination]; Marshall 1997: 168.

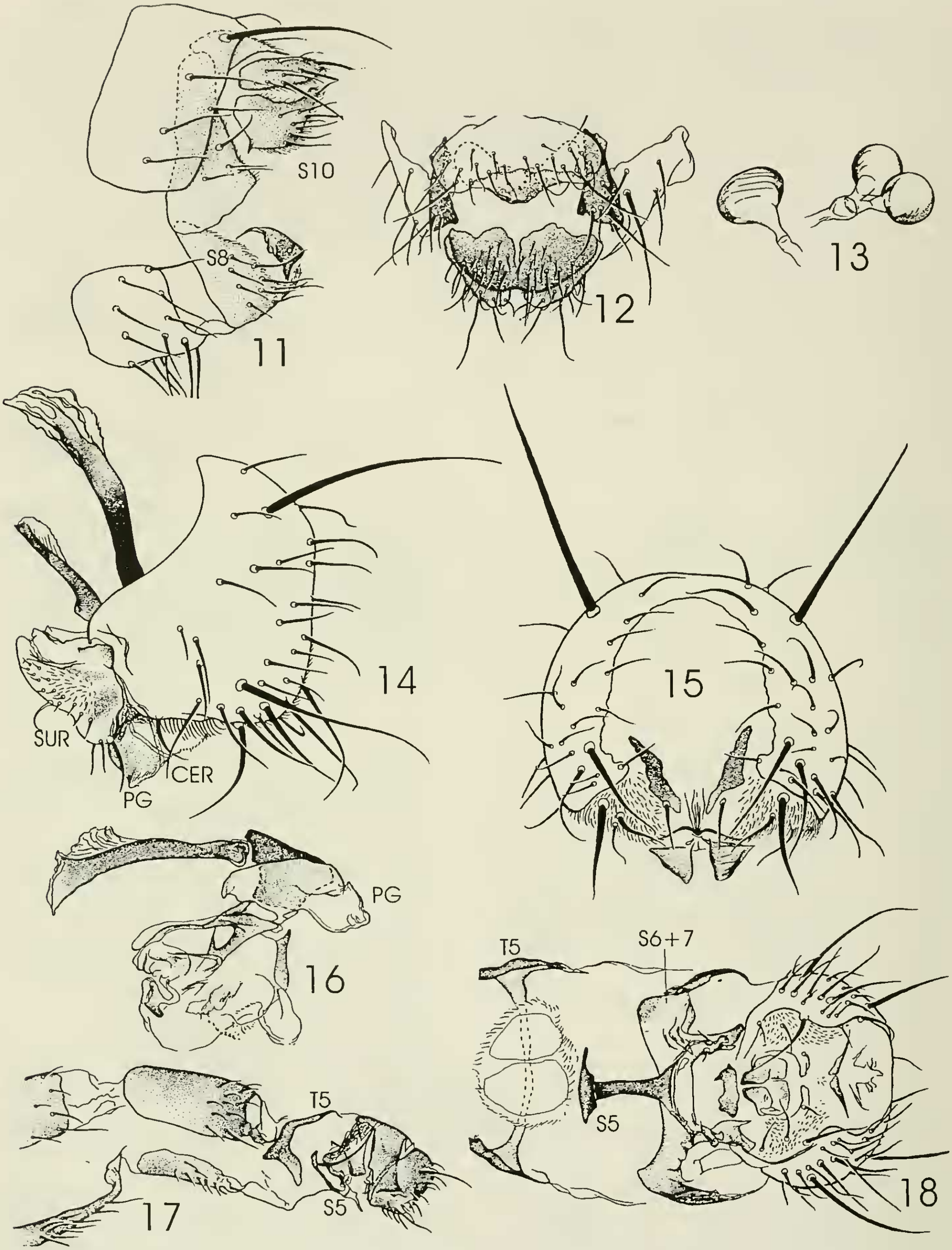
Leptocera (Chaetopodella) pulchripes Duda 1925: 151. Type locality: Paraguay; Richards 1963: 238 [synonymy].

Caetopodella pulchripes: Duda 1929: 34 [lapsus, generic combination].

Leptocera (Chaetopodella) pulchripes var. *griseithorax* Richards 1931: 79; Richards 1967: 11 [synonymy].

Gyretria binodatipes Enderlein 1938: 655; Type locality: Chile, Juan Fernandez Is.; Richards 1967: 11 [synonymy].

Description.—Body length ca. 2.0 mm, body dark brown to black with a heavy silvery pruinosity, pruinosity of scutum broken by three relatively bare longitudinal strips, middle strip wider than lateral ones. Interfrontal area as broad as high, flanked by three equal interfrontal bristles. Orbital bristles stout, in two pairs, lower pair half as long as upper pair. Face, outer surface of antenna and gena light brown, inner face of first flagellomere rufous at least basally; arista short-haired, as long as head width; eye bare, twice as high as genal height; gena with 3–4 rows of small bristles. Palp



Figs. 11–18. *Gyretria melanogaster.* 11–13, Female. 11, Terminalia, left lateral. 12, Terminalia, ventral.. 13, Spermathecae. 14–18, Male. 14, Terminalia, left lateral. 15, Terminalia, posterior. 16, Aedeagus and associated structures. 17, Posterior part of abdomen, lateral. 18, Posterior part of abdomen, ventral. Abbreviations: T5, tergite 5; PG, postgonite; S6+7, synsternite 6+7; S5, sternite 5; S8, sternite 8; S10, sternite 10; SUR, surstylus; CER, cercus.

with two long preapical ventral bristles, stipes with 3 long, thin bristles. Foreleg brown, male fore femur with a long, stout ventral bristle, male fore tibia with a pronounced swelling in distal third. Mid coxa, femur, and tibia except apex brown, apex of tibia and tarsomeres yellow to pale brown. Mid femur of male with two long ventral bristles in basal third; mid femur of female without ventral bristles. Dorsal surface of mid tibia in both sexes with four pairs of anterodorsal-posterodorsal bristles, the third anterodorsal bristle displaced almost to anterior surface. Hind leg with tip of tarsomere 2 and all of tarsomeres 3–5 white, sharply contrasting with brown tarsomere 1; hind leg of female similarly pigmented, but tarsomere 2 unmodified and tarsomere 1 small. Katepisternum with 2 long bristles, posterior dorsal bristle reaching wing base, anterodorsal bristle half as long. Wing milky-white, viens except costa very pale, costa pale brown; second costal sector 1.2–1.3× as long as third costal sector, costa not extending beyond end of R4+5.

Male abdomen with first two tergites (syntergite 1+2 and tergite 3) twice as long and almost twice as broad as tergite 4, syntergite 1+2 velvety black, tergite 3 velvety black except for large, quadrate, pale posteromedial section, tergite 4 brown, tergite 5 (normally telescoped under tergite 4) pale and desclerotised except for transverse and weakly U-shaped anterior margin and dark anterolateral lobes (Figs. 17–18). Sternite 4 subquadrate, not modified, membrane between sternite 4 and sternite 5 with two small, membranous swellings or invaginations covered with long, pale setae (swellings in critical-point dried specimens, invaginations in air-dried specimens). Sternite 5 very narrow, slightly expanded at anterior and posterior end, posterolateral corners extended into pale, multifurcate lobes (Fig. 18). Epandrium with long ventral and posteroventral bristles and a very long posterodorsal bristle (Fig. 15). Surstylus broad, pale, setulose, with a narrow, distally expanded lateral lobe near mid ventral margin (Fig. 14). Postgonite broad, apex simple; basiphallus short (Fig. 16).

Female abdomen short, sternite 8 small, simple; a small convex sclerite near genital opening and internal genital sclerotisation present (Figs. 11–12). Sternite 10 large, setulose, medially desclerotised. Spermathecae spherical, with surface striate (Fig. 13).

Type material examined.—Holotype (male, headless) and 5 paratypes (3 females, 2 males) of *Chaetopodella pulchripes* var. *griseithorax* Richards. ARGENTINA. Buenos Aires, "21.x.26" (BMNH). Holotype (female) of *Limosina melanogaster* Thompson. ARGENTINA. Buenos Aires (labelled with three printed labels: "Buen/ Ayr.," "Kinb." and "Typus" and an old red loan tag "245/60.") (NHRS); examined by Dr. Thomas Pape (NHRS). The type of *G. binodatipes* Enderlein was not examined, but Enderlein's figures leave no doubt about the identity of this species, which does not resemble anything else found on Juan Fernandez Islands.

Other material examined (approx. 300 specimens).—ARGENTINA. Buenos Aires, San Isidro, 25.viii.1929, Shannon & Shannon (USNM); Salta, Palo Pintado, N. San Carlos, 1,900 m, 6.x.1968, L. Peña (CNC); Catamarca, 18 km N La Merced, 1,000 m, 26.ix.1968, L. Peña (CNC). BRAZIL. São Paulo, São José de Barreiro, 1,650 m, i.1969, malaise, M. Alvarenga; Rio de Janeiro, Teresopolis, Pedra do Sino, 2,000 m, human dung, 14.iii.1990, S. Marshall; Santa Catarina, Nova Teutônia, 300–500 m, xi.1966, F. Plaumann (CNC); Minas Gerais, Tiradentes, Serra de Tiradentes, human dung, 16.ii.1990, S. Marshall. CHILE. Juan Fernández Islands, Robinson Crusoe Island, San Juan Bautista, English Bay, Plazoleta, i.1992, i.1993, dung, sweep, and pans, S.A. Marshall; Santiago, Peñalolen, x.1953, L. Peña (CNC); Hacienda Illapel, Coquimbo, 1–6.xi.1954, 500 m, L. Peña (CNC); Rio Clarillo, 10 km S Santiago, 3.xi.1989, S.A. Marshall.

Distribution.—Argentina, Brazil, Paraguay, Uruguay, Chile.

Comments.—This easily recognized species is one of the most common insects on the Juan Fernandez Islands, where it is abundant on equine feces. *Gyretria melanogaster* is also locally abundant in mainland Chile, but where it is sympatric with *G. biseta* in Brazil and Argentina the latter species seems to be much more abundant.

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LITERATURE CITED

Duda, O. 1925. Die außereuropäischen Arten der Gattung *Leptocera* Olivier-*Limosina* Macquart (Dipteren) mit Berücksichtigung der europäischen Arten. Archiv für Naturgeschichte, Berlin, Abteilung A, 90(11)(1924): 5–215.

———. 1929. Die Ausbeute der deutschen Chako-Expedition 1925/1926 (Diptera). VI. Sepsidae, VII. Piophilidae, VIII. Cypselidae, IX. Drosophilidae und X. Chloropidae. Konowia 8(1): 33–50.

———. 1938. Sphaeroceridae (Cypselidae). *In* Lindner, E., ed., Die Fliegen der palaearktischen Region, Vol. 6, 182 pp., E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart.

Enderlein, G. 1938. Die Dipterenfauna der Juan Fernandez Inseln und der Oster Insel, pp. 643–680. *In* Skottsberg, C., ed., The Natural History of Juan Fernández and Easter Island, 3 (Zool.), Uppsala.

Marshall, S. A. 1997. Sphaeroceridae of the Juan Fernandez Islands, Chile. Studia Dipterologica 4: 165–171.

Richards, O. W. 1931. Sphaeroceridae (Borboridae). *In* Diptera of Patagonia and south Chile, based mainly on material in the British Museum (Natural History) 6(2): 62–84.

———. 1963. Sphaerocerid flies from South and Central America in the collection of the California Academy of Sciences (Diptera). Pan-Pacific Entomologist 39: 231–246.

———. 1967. 72. Family Sphaeroceridae (Borboridae). *In* Vanzolini. E. P. and N. Papavero, eds., A Catalogue of the Diptera of the Americas South of the United States, Vol. 72, 28 pp., Departamento de Zoologia, Secretaria da Agricultura, São Paulo.

Roháček, J. 1983. A monograph and re-classification of the previous genus *Limosina* Macquart (Diptera, Sphaeroceridae) of Europe. Part II. Beiträge zur Entomologie, Berlin 33: 3–195.

Thomson, C. G. 1869. 6. Diptera. Species nova descripsit. *In* Kongliga svenska fregatten Eugenies Resa omkring jorden under befäl af C. A. Virgin, åren 1851–1853. pt. 2 (Zoologie), Sec.1 (Insecter), 617 pp. (p. 443–614), Kongliga Svenska Vetenskaps-Akademien, P. A. Norstedt & Söner, Stockholm.